

JOINT INTEROPERABILITY & ENGINEERING ORGANIZATION

CENTER FOR SOFTWARE

Management Plan MP

15 April 1995

SOFTWARE TEST REPORT (STR)

FOR THE

AIRFIELDS SYSTEM

Version 2.0.1

(D R A F T)

Revised 14 February 1996

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ACKNOWLEDGEMENT

This document was prepared for the Defense Information Systems Agency (DISA), Joint Interoperability and Engineering Organization (JIEO), Center for Software (JEX), Software Development Department (JEXN), General Applications Division (JEXNG).

This Software Test Report contains a record of the qualification testing that was performed on the re-engineered/re-hosted Airfields system. The system, which was previously part of the Worldwide Command and Control System (WWMCCS), currently resides as a segment of the Global Command and Control System's (GCCS') Common Operating Environment (COE).

Any questions, comments, or considerations relative to this Software Test Plan should be directed to the Ada 95 Early Adoption Program Team Leader. The team leader can be reached at the following address:

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SECTION 1. SCOPE

1.1 Identification. The Airfields system provides the Worldwide Military Command and Control System (WWMCCS) community with a wide range of data about free world airfields. All data is supplied by the Defense Mapping Agency Aerospace Center (DMAAC) and is updated monthly. The Airfields Retrieval system was re-engineered from COBOL to the Ada 95 language and provides reports in several different formats both on- and off-line; One-Line, One-Page, Multi-Page, Selective Data Retrievals, and Turnaround reports. The current version of the system is being fielded as Phase 1, Version 1.0, Release One.

1.2 System Overview. The functional proponent for Airfields is the Joint Staff Logistics Directorate (J4). The office of primary responsibility (OPR) is the Operations Planning Division. The designated development Agency (DDA) is the Center for Software (JEX), Software Development Department (JEXN), General Applications Division (JEXNG).

The Airfields System has been re-engineered/re-hosted and runs under the Unix environment on a Sun Solaris workstation, utilizes Oracle 7 (a relational database management system (RDBMS)), and is written in the Ada 95 programming language with a frontend Graphical User Interface (GUI).

The system complies with the Global Command and Control System's (GCCS') Integration Standards and employs many standards such as the windowing capability and an extensive Help facility to aid the user with system operation. The primary operational site consists of the Worldwide Military Command and Control System (WWMCCS) community.

The original system was hosted on proprietary hardware under a WWMCCS COBOL environment. The system's original release date was 15 May 1990. Historically, WWMCCS users access the system approximately 100 times per month. The database is owned by the Defense Mapping Agency Aerospace Center (DMAAC) and contains data on approximately 44,000 airfields and consists of over one million records.

1.3 Document Overview. The purpose of this Software Test Plan (STP) is to describe the plans for qualification testing of the Airfields System. It describes the software test environment to be used for the testing, identifies the tests to be performed, and provides schedules for test activities.

2. REFERENCED DOCUMENTS

- a. Department of Defense, Military Standard Software

Development and Documentation, MIL-STD-498, 5 Dec 1994

- b. Data Item Description (DID) number DI-IPSC-81440, Software Test Report (STR), 5 Dec 1994
- c. Joint Interoperability & Engineering Organization (JIEO), Washington, DC, Software Test Plan (STP) (Draft), 15 April 1995
- d. Joint Interoperability & Engineering Organization (JIEO), Washington, DC, Software Version Description (SVD) (Draft), 15 April 1995

3. OVERVIEW OF TEST RESULTS

An overview of the test results for the Airfields System follows:

3.1 Overall Assessment of the Software Tested. The software performed as expected. The system is user-friendly and the screens are easy to follow. The first time user of the system should have no problems in executing the system.

3.2 Impact of Test Environment. N/A

3.3 Recommended Improvements. No improvements are recommended for the system at this time.

4. DETAILED TEST RESULTS

4.1 One-Line Summary Report Test Results. The One-Line Summary Report has been tested according to the tests defined in Sections 4.1 through 4.6.1.7 of the Airfields Software Test Description (STD). No class one or class two errors were noted.

4.1.1 Summary of Test Results. The Airfields application performed as expected when executing/producing the Airfields One-Line Summary Report.

4.1.2 Problems Encountered. None.

4.2 One-Page Summary Report Test Results. The One-Page Summary Report has been tested according to the tests defined in Sections 4.7 through 4.12.1.7 of the STD. No class one or class two errors were encountered.

4.2.1 Summary of Test Results. The Airfields application performed as expected when executing/producing the Airfields One-Page Summary Report.

4.2.2 Problems Encountered. None.

4.3 Multi-Page Report Test Results. The Multi-Page Report has been tested according to the tests defined in Sections 4.13 through 4.18.1.7 of the Airfields STD. No class one or class two errors were noted.

4.3.1 Summary of Test Results. The Airfields application performed as expected when executing/producing the Airfields Multi-Page Report.

4.3.2 Problems Encountered. None.

4.4 Turnaround Calculation Report Test Results. The Turnaround Calculation Report has been tested according to the tests defined in Sections 4.19 through 4.24.1.7 of the Airfields STD. No class one or class two errors were noted.

4.4.1 Summary of Test Results. The Airfields application performed as expected when executing/producing the Airfields Turnaround Calculation Report.

4.4.2 Problems Encountered. None.

4.5 Selective Data Retrieval Test Results. The Selective Data Retrieval has been tested according to the tests defined in Sections 4.25 through 4.30.1.7 of the STD. No class one or class two errors were noted.

4.5.1 Summary of Test Results. The Airfields application performed as expected when executing/producing the Airfields Selective Data Retrieval.

4.5.2 Problems Encountered. None.

5. **TEST LOG.** See Appendix A of this Software Test Report (STR).

6. **NOTES.**

6.1 Terms and Abbreviations.

CFSW	Center for Software
COE	Common Operating Environment
DBMS	Data Base Management System
DDA	Designated Development Agency
DID	Data Item Description
DISA	Defense Information Systems Agency
DMAAC	Defense Mapping Agency Aerospace Center
DoD	Department of Defense
GCCS	Global Command and Control Systems
GUI	Graphical User Interface
JIEO	Joint Interoperability & Engineering Organization

OPR	Office of Primary Responsibility
RDBMS	Relational Database Management System
STD	Standard
	Software Test Description
STP	Software Test Plan
STR	Software Test Report
SUM	Software Users Manual
SVD	Software Version Description
WWMCCS	Worldwide Military Command and Control Systems

Appendix A

Test Log

One-Line Summary Report

Selection Type CC	COBOL Implementation Min:Sec:Hundreths	Ada 95 Implementation Min:Sec:Hundreths
Test #1	0:13:00	1:27:66
Input: 15 (Hawaii)		
Test #2	0:17:33	1:08:49
Input: 15 (Hawaii)		
BE		
Test #1	0:05:00	0:03:86
Input: 0599000400		
Test #2	0:05:94	0:03:01
Input: 0599000409		
ICAO		
Test #1	0:10:91	0:04:08
Input: PHDH		
Test #2	0:06:32	0:06:00
Input: PHBK		
GEOLOC		
Test #1	0:16:69	0:07:09
Input: AWSO & MSSN		
Test #2	0:09:00	0:04:91
Input: LXKM & DJAD		
Airfield Name		
Test #1	0:12:15	0:04:99
Input: PUUNENE		
Test #2	0:06:75	0:05:97
Input: DILLINGHAM		
Coordinate-Radius		
Test #1	00:17:12	1:18:21
Input: 214227N1575820W		
500 Mile Radius		
Test #2	0:18:77	1:19:01
Input: 214228N1575830W		
500 Mile Radius		

One-Page Summary Report

Selection Type	COBOL Implementation	Ada 95 Implementation
CC	Min:Sec:Hundreths	Min:Sec:Hundreths
Test #1	0:21:32	6:02:06
Input: 15 (Hawaii)		
Test #2	0:32:70	5:31:17
Input: 15 (Hawaii)		
BE		
Test #1	0:05:67	0:03:26
Input: 0599000400		
Test #2	0:05:82	0:03:87
Input: 0599000409		
ICAO		
Test #1	0:09:22	0:07:31
Input: PHNA		
Test #2	0:08:27	0:04:50
Input: PHBK		
GEOLOC		
Test #1	0:08:24	0:08:60
Input: AWSD & MSSN		
Test #2	0:07:67	0:07:04
Input: LXKM & DJAD		
Airfield Name		
Test #1	0:06:94	0:05:63
Input: KAHUKU		
Test #2	0:11:02	0:07:57
Input: DILLINGHAM		
Coordinate-Radius		
Test #1	0:21:11	5:02:04
Input: 214227N1575820W		
500 Mile Radius		
Test #2	0:20:29	5:12:64
Input: 214228N1575830W		
500 Mile Radius		

Multipage Report

- Timing for COBOL implementation was stopped when the user received a job submission number (SNUMB).
- Timing for the Ada 95 implementation will be stopped when a multipage report appears on the screen.

Selection Type	COBOL Implementation	Ada 95 Implementation
CC	Min:Sec:Hundreths	Min:Sec:Hundreths
Test #1	00:05:00	43:13:60
Input: 15 (Hawaii)		
Test #2	00:15:81	43:00:10
Input: 15 (Hawaii)		
BE		
Test #1	00:17:42	00:06:56
Input: 0599000400		
Test #2	00:13:87	00:04:60
Input: 0599000409		
ICAO		
Test #1	00:10:21	00:06:50
Input: PHDH		
Test #2	00:20:62	00:08:66
Input: PHBK		
GEOLOC		
Test #1	00:12:00	00:10:83
Input: AWSO & MSSN		
Test #2	00:10:50	00:09:80
Input: LXKM & DJAD		
Airfield Name		
Test #1	00:10:89	00:07:16
Input: PUUNENE		
Test #2	00:17:32	00:10:25
Input: DILLINGHAM		
Coordinate-Radius		
Test #1	00:10:58	41:17:26
Input: 214227N1575820W		
500 Mile Radius		
Test #2	00:12:58	40:27:21
Input: 214228N1575830W		
500 Mile Radius		

Turnaround Report

- Data retrieved for this report was: C-5 Aircraft with a simulation which consisted of 75,000 square feet of parking space with a turntime of 2 hours.

Selection Type	COBOL Implementation	Ada 95 Implementation
CC	Min:Sec:Hundreths	Min:Sec:Hundreths
Test #1	Not Collected	1:21:04
Input: 15 (Hawaii)		
Test #2	Not Collected	1:23:17
Input: 15 (Hawaii)		
BE		
Test #1	Not Collected	0:02:65
Input: 0599000400		
Test #2	Not Collected	0:02:90
Input: 0599000409		
ICAO		
Test #1	Not Collected	0:05:92
Input: PHNA		
Test #2	Not Collected	0:05:57
Input: PHBK		
GEOLOC		
Test #1	Not Collected	0:30:57
Input: AWSO & MSSN		
Test #2	Not Collected	0:23:39
Input: LXKM & DJAD		
Airfield Name		
Test #1	Not Collected	0:04:85
Input: KAHUKU		
Test #2	Not Collected	0:06:06
Input: DILLINGHAM		
Coordinate-Radius		
Test #1	Not Collected	1:19:57
Input: 214227N1575820W		
500 Mile Radius		

Test #2

Not Collected

1:32:20

Input: 214228N1575830W

500 Mile Radius

Selective Data Retrieval Report

- Data retrieved for this report was: Hardstands, Lighting, Parking, and Defueling Facilities.

Selection Type	COBOL Implementation	Ada 95 Implementation
CC	Min:Sec:Hundreths	Min:Sec:Hundreths
Test #1	0:15:42	1:33:45
Input: 15 (Hawaii)		
Test #2	Not Collected	1:38:10
Input: 15 (Hawaii)		
BE		
Test #1	0:04:32	0:03:30
Input: 0599000400		
Test #2	Not Collected	0:02:71
Input: 0599000409		
ICAO		
Test #1	0:05:98	0:06:15
Input: PHNA		
Test #2	Not Collected	0:19:80
Input: PHBK		
GEOLOC		
Test #1	0:10:42	0:07:08
Input: AWSN & MSSN		
Test #2	Not Collected	0:20:35
Input: LXXM & DJAD		
Airfield Name		
Test #1	0:06:38	0:05:02
Input: KAHUKU		
Test #2	Not Collected	0:06:09
Input: DILLINGHAM		
Coordinate-Radius		
Test #1	0:27:76	1:36:55
Input: 214227N1575820W		
500 Mile Radius		
Test #2	Not Collected	1:40:53
Input: 214228N1575830W		
500 Mile Radius		

User Interface Errors for a Task

This is the number of incorrect or wrong keystrokes/mouse events a user makes while interacting with the Airfields application. The following is the number of errors the same user makes while producing the same report under both applications.

The results of these timing tests may not be indicative of what a typical user might encounter. As users become more familiar with the application, it is anticipated that the number of errors will go down substantially for both implementations of Airfields.

One-Line Summary Report

Selection Type	COBOL Implementation	Ada 95 Implementation
CC	Number of Errors	Number of Errors
Test #1	2	TBD
Input: 15 (Hawaii)		
Test #2	0	TBD
Input: 15 (Hawaii)		
BE		
Test #1	2	TBD
Input: 0599000400		
Test #2	0	TBD
Input: 0599000409		
ICAO		
Test #1	0	TBD
Input: PHDH		
Test #2	0	TBD
Input: PHBK		
GEOLOC		
Test #1	0	TBD
Input: AWSD & MSSN		
Test #2	0	TBD
Input: LXKM & DJAD		
Airfield Name		
Test #1	0	TBD
Input: PUUNENE		
Test #2	0	TBD
Input: DILLINGHAM		
Coordinate-Radius		
Test #1	1	TBD
Input: 214227N1575820W		
500 Mile Radius		
Test #2	0	TBD
Input: 214228N1575830W		
500 Mile Radius		

One-Page Summary Report

Selection Type	COBOL Implementation	Ada 95 Implementation
CC	Number of Errors	Number of Errors
Test #1	0	TBD
Input: 15 (Hawaii)		
Test #2	0	TBD
Input: 15 (Hawaii)		
BE		
Test #1	0	TBD
Input: 0599000400		
Test #2	0	TBD
Input: 0599000409		
ICAO		
Test #1	0	TBD
Input: PHNA		
Test #2	System Error Occurred	TBD
Input: PHBK		
GEOLOC		
Test #1	0	TBD
Input: AWSD & MSSN		
Test #2	1	TBD
Input: LXKM & DJAD		
Airfield Name		
Test #1	0	TBD
Input: KAHUKU		
Test #2	0	TBD
Input: DILLINGHAM		
Coordinate-Radius		
Test #1	0	TBD
Input: 214227N1575820W		
500 Mile Radius		
Test #2	0	TBD
Input: 214228N1575830W		
500 Mile Radius		

Multipage Report

Selection Type	COBOL Implementation	Ada 95 Implementation
CC	Number of Errors	Number of Errors
Test #1	0	TBD
Input: 15 (Hawaii)		
Test #2	0	TBD
Input: 15 (Hawaii)		
BE		
Test #1	0	TBD
Input: 0599000400		
Test #2	1	TBD
Input: 0599000409		
ICAO		
Test #1	0	TBD
Input: PHDH		
Test #2	0	TBD
Input: PHBK		
GEOLOC		
Test #1	1	TBD
Input: AWSO & MSSN		
Test #2	1	TBD
Input: LXKM & DJAD		
Airfield Name		
Test #1	0	TBD
Input: PUUNENE		
Test #2	0	TBD
Input: DILLINGHAM		
Coordinate-Radius		
Test #1	0	TBD
Input: 214227N1575820W		
500 Mile Radius		
Test #2	0	TBD
Input: 214228N1575830W		
500 Mile Radius		

Turnaround Report

Selection Type	COBOL Implementation	Ada 95 Implementation
CC	Number of Errors	Number of Errors
Test #1	TBD	TBD
Input: 15 (Hawaii)		
Test #2	TBD	TBD
Input: 15 (Hawaii)		
BE		
Test #1	TBD	TBD
Input: 0599000400		
Test #2	TBD	TBD
Input: 0599000409		
ICAO		
Test #1	TBD	TBD
Input: PHNA		
Test #2	TBD	TBD
Input: PHBK		
GEOLOC		
Test #1	TBD	TBD
Input: AWSN & MSSN		
Test #2	TBD	TBD
Input: LXKM & DJAD		
Airfield Name		
Test #1	TBD	TBD
Input: KAHUKU		
Test #2	TBD	TBD
Input: DILLINGHAM		
Coordinate-Radius		
Test #1	TBD	TBD
Input: 214227N1575820W		
500 Mile Radius		
Test #2	TBD	TBD
Input: 214228N1575830W		
500 Mile Radius		

Selective Data Retrieval Report

- Data retrieved for this report was: Hardstands, Lighting, Parking, and Defueling Facilities.

Selection Type	COBOL Implementation	Ada 95 Implementation
CC	Number of Errors	Number of Errors
Test #1	2	TBD
Input: 15 (Hawaii)		
Test #2	Not Collected	TBD
Input: 15 (Hawaii)		
BE		
Test #1	0	TBD
Input: 0599000400		
Test #2	Not Collected	TBD
Input: 0599000409		
ICAO		
Test #1	0	TBD
Input: PHNA		
Test #2	Not Collected	TBD
Input: PHBK		
GEOLOC		
Test #1	0	TBD
Input: AWSN & MSSN		
Test #2	Not Collected	TBD
Input: LXXM & DJAD		
Airfield Name		
Test #1	0	TBD
Input: KAHUKU		
Test #2	Not Collected	TBD
Input: DILLINGHAM		
Coordinate-Radius		
Test #1	0	TBD
Input: 214227N1575820W		
500 Mile Radius		
Test #2	Not Collected	TBD
Input: 214228N1575830W		
500 Mile Radius		

Detected Faults

There are currently 7 outstanding bug reports written against the delivered baseline.

Hierarchical Library Unit (HLU) Speedup

At the request of the AJPO director, the mentors reimplemented all library units for which child library units had been removed in order to make the software run under the Thomson ObjectAda compiler.

When the final GNAT implementation of ScreenMachine that will be used to deliver the Airfields system is in hand, the software (software from Phase 1 of the project) will be recompiled under this final version and the speed of each implementation will be measured.

HLU Size Differential

The following results are from Phase 1 implementation using the GNAT 2.05 compiler.

Size of executable without HLUs	1983260 bytes
Size of executable with HLUs	1833920 bytes
Size differential	149340 bytes or 7.5% savings

When the final GNAT implementation of ScreenMachine that will be used to deliver the Airfields system is in hand, this same software will be recompiled under this final version and the size of each implementation will be remeasured.

Number of Upward Incompatibilities with Oracle Binding

There were no upward incompatibilities in the Ada code used in the Oracle binding.

Number of Compiler Dependencies with Oracle Binding

The Ada code used in the Oracle binding depended on the compiler implementing the Ada predefined Integer type as 16 bits.